

ABSTRACT OF THE DISCLOSURE

The maize gene *dull1* (*dul*) of the present invention is a determinant of the structure of endosperm starch. Mutations of *dul* affect the activity of at least two enzymes involved in starch biosynthesis, namely the starch synthase, SSII, and the starch branching enzyme, SBEIIa. *Dul* codes for a predicted 1674 residue protein, and is expressed with a unique temporal pattern in endosperm but is undetectable in leaf or root. The size of the *Dul* product and its expression pattern match precisely the known characteristics of maize SSII. The *Dul* product contains two different repeated regions in its unique amino terminus, one of which is identical to a conserved segment of the starch debranching enzymes. The cDNA provided for in the present invention encodes SSII, and mutations within this gene affect multiple aspects of starch biogenesis by disrupting an enzyme complex containing starch synthase(s), starch branching enzyme(s), and possibly starch debranching enzyme(s).